Will CMMI Work for Software-Only Organizations?

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Agenda

- Perceptions and premise
- Architecture differences
- Terminology differences
- Process area differences
- Summary

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Perceptions

- 1993 – “The CMM for Software is intended for large, monolithic DoD software projects. It won’t work in the real world of small projects in commercial companies.”

- 2001 – “The CMMI is intended for large, monolithic DoD systems engineering projects. It won’t work in the real world of small projects in commercial companies.”

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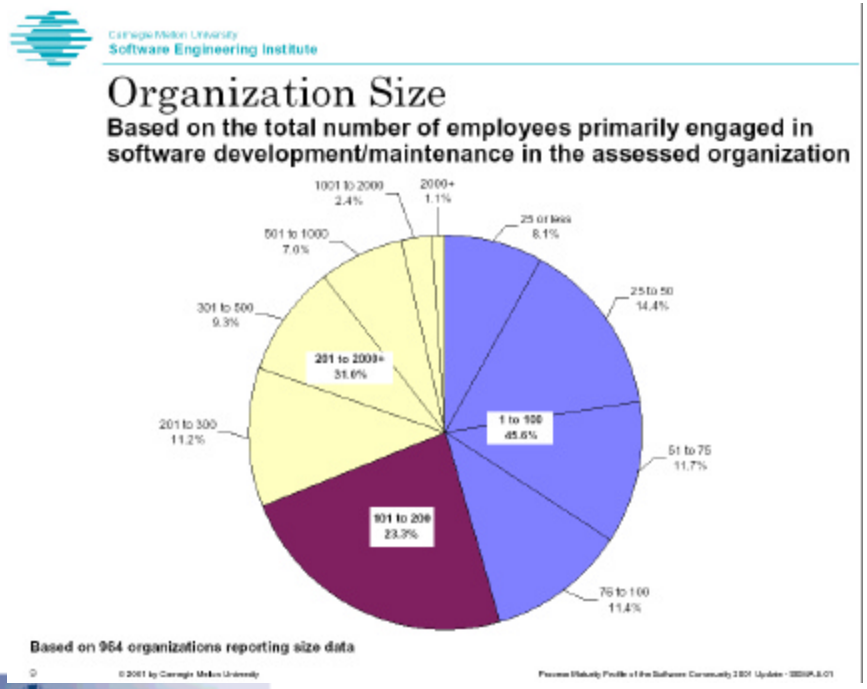
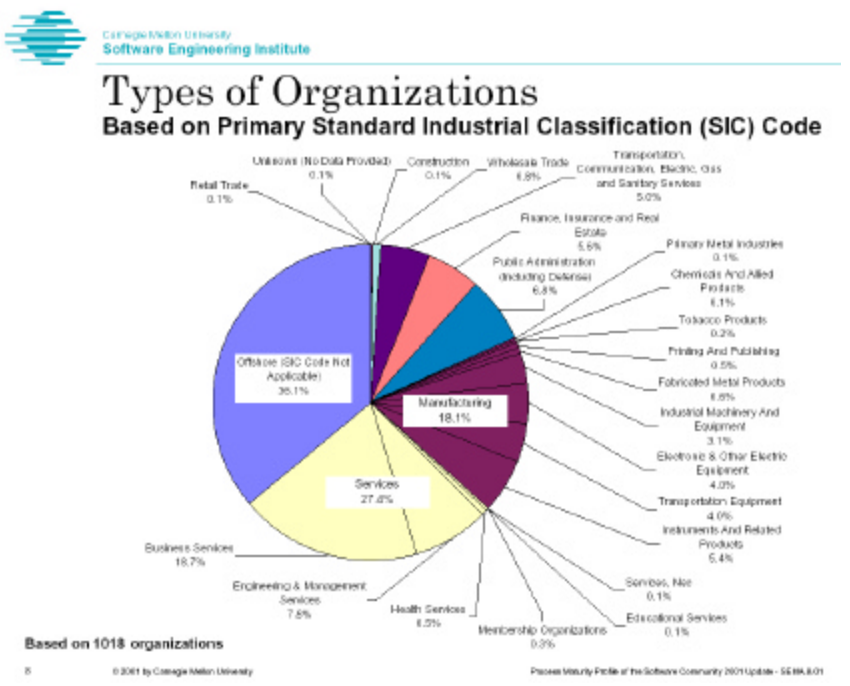
Premise

- Just like the Software CMM, CMMI can be used effectively by a large array of projects/organizations
  - APPROPRIATELY INTERPRETED AND APPLIED WITH JUDGMENT





CMMI Architecture Differences

- Two representations allow choices
  - Staged – pre-sequenced grouping of process areas
  - Continuous – user-sequenced application
- Specific and Generic Goals/Practices provide a more strict and logical hierarchy
- Discipline-specific amplifications provide guidance for software vs. systems engineering functions

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Terminology Differences Product/Product Components

- CMMI terminology
  - Product – final system delivered to customer
  - Product component – subsystems/modules built separately and integrated into final product

- Software-only terminology
  - System – final product delivered to customer
  - Subsystems/Modules – product components built separately and integrated into final product

Terminology Differences Local/Global

- CMMI terminology
  - Local – project or team working as a unit on a specific scope
  - Global – larger group of projects/teams working as a unit on a business scope

- Software-only terminology
  - Project – team working on a specific system/scope
  - Organization – larger group of projects working as a unit on a business scope

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Terminology Differences
Goals, Practices, Sub-practices

- CMMI terminology
  - Goals – required to be satisfied in order to achieve capability/maturity
  - Practices – expected to be implemented to satisfy goals
  - Sub-practices – informative material intended as a guide to implementing goals

- Software-only terminology
  - Goals – required to be satisfied in order to achieve maturity
  - Key Practices – most assessors require to be satisfied
  - Sub-practices – varied interpretation, from required to informative

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Process Area Differences Requirements Management

- CMMI
  - Added requirement to maintain bi-directional traceability

Process Area Differences
Project Planning

CMMI

- Establish estimates – scope, attributes, life cycle, effort and cost
- Develop plan – budget, schedule, risks, data management, resources, training, stakeholder involvement
- Obtain commitment to plan

SW-CMM

- Create estimates – size, cost, effort, schedule, critical resources, life cycle
- Develop plan - SDP
- Obtain commitment to plan

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Process Area Differences
Supplier Agreement Management

- CMMI
  - Establish Customer/supplier relationship and agreement
    - Analyze needs and requirements
    - Select suppliers
    - Establish agreement
  - Satisfy agreement
    - Acquire COTS
    - Execute agreement
    - Conduct acceptance testing
    - Transition product

- SW-CMM
  - Select Subcontractor
  - Establish contract
  - Monitor performance
  - Perform acceptance testing

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Process Area Differences Measurement and Analysis

CMMI

- Separate process area
- Institutionalize a measurement and analysis process
- Measures used (indirectly) as a part of monitoring and controlling each process area

SW-CMM

- Measurement and analysis common feature in every process area
- Measures established and used to monitor the status and effectiveness of the process

Process Area Differences
Engineering Process Areas (RM)

- CMMI – Requirements Development PA
  - Develop Customer Requirements – stakeholder needs, expectations, constraints and interfaces lead to…
  - Develop requirements – customer requirements elaborated into product requirements…
  - Analyze and validate requirements – resulting in defined functionality

- SW-CMM
  - One practice in SPE – systematically analyze requirements

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Process Area Differences
Engineering Process Areas (TS)

- CMMI – Technical Solution PA
  - Select appropriate solution
  - Develop the design
  - Implement the design

- SW-CMM
  - One practice in SPE addresses software design
  - One practice in SPE addresses coding

Process Area Differences
Engineering Process Areas (PI)

CMMI – Product Integration PA

- Prepare for integration
- Ensure interface compatibility
- Assemble components and deliver solution

SW-CMM

- Assumes subsystems/modules will be integrated through testing activities
  - Partially covered in SPP (planning for testing facilities)
  - Partially covered in SCM (interface change control)
  - Partially covered in SPE (integration through multiple levels of testing)

Process Area Differences
Engineering Process Areas (VER)

- CMMI – Verification PA
  - Verification = satisfaction of requirements
  - Prepare for verification
  - Perform peer reviews
  - Verify selected work products

- SW-CMM
  - Preparation through SPP (planning for testing facilities)
  - Verification of requirements satisfaction through:
    - Peer Review KPA
    - Testing (SPE)
    - Requirements change control (RM)
    - Requirements traceability (SPE)

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Process Area Differences
Engineering Process Areas (VAL)

- CMMI – Validation PA
  - Validation = performance in operational environment
  - Prepare for validation
  - Validate product or product components

- SW-CMM
  - Preparation through SPP (planning for testing facilities)
  - Validation through acceptance testing (SPE)

Process Area Differences
Risk Management

- CMMI
  - Single practices in PP and PMC
  - Risk Management PA
    - Prepare for risk management
    - Identify and analyze risks
    - Mitigate risks

- SW-CMM
  - Single practices in SPP, SPTO, ISM

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Process Area Differences
Decision Analysis and Resolution

CMMI

- Evaluate alternatives
- Structured decision-making process applied to any PA where appropriate

SW-CMM

- PCM and TCM at Maturity Level 5
  - Focus is on cost/benefit

Summary

- There are differences between CMMI and SW-CMM
  - Architecture
  - Terminology
  - Process Areas
- Equalizes emphasis on Engineering and Management processes
  - Requires interpretation to relate systems engineering terminology and approach to typical software development
- With appropriate interpretation:
  - CMMI ** will ** work for software-only organizations
  - Software-only organizations can gain significant benefit from SW-CMM lessons learned and incorporated into CMMI

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